Eelgrass:

Coalition Perspective:

- Prolonged reduction in eelgrass cover began in 2006.
- The Coalition cites the effects of the Mother's Day storm in 2006 (when up to 15 inches of rain fell over the course of a few days) for eelgrass loss within Great Bay proper during this year.
- Great Bay has not been able to recover from the extreme storm event in 2006 but was able to recover from a wasting disease outbreak in 1989 when the eelgrass acreage in Great Bay dropped to about 300 acres.
- Eelgrass losses are caused by factors other than nitrogen such as turbidity, colored dissolved organic matter (CDOM), and sediment loads.
- The Coalition focuses on eelgrass coverage in Great Bay proper

EPA Perspective:

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Coalition Perspective:

- The Coalition cites to a PREP, 2016 report titled "Eelgrass/Macroalgae Discussion Primer for TAC Activities 2016-2017" stating, "These surveys have documented mats of macroalgae even below dense eelgrass beds. In this case is appears that eelgrass and macroalgae apparently co-exist in such a way that it is possible for complete coverage by both plant types."

EPA Perspective:

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Coalition Assessment of TN and Chlorophyll-a Response in the Upper Piscataqua River Following Voluntary TN Reductions at the Dover and Rochester POTWs

Coalition Perspective:

- In 2015 the Coalition performed sampling in the Upper Piscataqua River and also deployed data sondes at several locations. This sampling was performed following upgrades to both the Rochester and Dover POTWs.
- On page 10 of their report the Coalition states that while total nitrogen decreased significantly, no corresponding reduction in chlorophyll-a was detected in 2015.
- They also state that DO concentrations in these waters were also demonstrated to be insensitive to the change in ambient TN and DIN levels.

EPA Perspective:

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Deliberative Process / Ex. 5 **materials from the Piscataqua Region Estuaries Partnership (PREP), New Hampshire Department of Environmental Services (NHDES), and external advisors:**

Coalition Assertion and Citation:

- Decreases in dissolved inorganic nitrogen to levels from the 1970s and early 1990s show improvements to the system.
- PREP's 2018 State of Our Estuaries (SOOE). "Since then, DIN levels have decreased such that the concentrations in 2014-2015 are equivalent to those concentrations seen in the 1970s (PREP 2018 SOOE at 18-19)."

Full/Omitted Citations EPA Perspective:

- The Coalitions does not provide the part of the SOOE report on DIN which states, "This report discuss two forms of nitrogen: total nitrogen (TN) and dissolved inorganic nitrogen (DIN). It is important to note that both forms – but especially DIN, are taken up quickly by plants and algae, so the concentration of DIN does not necessarily reflect the potential effects of nitrogen on the estuarine system."
- The Coalition also leaves out the statement from the SOOE report stating, "Additionally, loading has been reduced due to consecutive years of low annual rainfall amounts and low occurrence of extreme rainfall events, which equates to less non-point source loadings from run-off."

Coalition Assertion and Citation:

- The Coalition cites to NHDES's 2016 final Section 303(d) list and the Great Bay Estuary 303(d) List Technical Support Document (TSD) to support their view that nitrogen is not an issue for Great Bay.
- The Coalition provides the following quote from the TSD, "It is less clear, at this time, whether the response datasets demonstrate sufficient power to determine that the eutrophication effects on designated used can be attributed to total nitrogen alone. Given that uncertainty, impairment is not warranted under New Hampshire's narrative standard. As such, this assessment zone has been assessed at Insufficient Information – Potentially Not Supporting (3-PNS)."

Full/Omitted Citations EPA Perspective:

- The Coalition leaves out importance sentences prior to their citation. These sentences state, "Chlorophyll-a experiences peak concentrations annually from 10-69 ug/L in the south western area. The eelgrass beds are degraded and the available light attenuation (median=1.5 m^-1 (n=128)) is poor. For shallow systems, it is expected that changes in macroalgae will precede changes in phytoplankton (McGlathery, Sundbäck, & Anderson, 2007) (Valiela, et al., 1997), as appears to be occurring in the Great Bay assessment zone. There is evidence that macroalgae is impacting eelgrass and changing the species composition and diversity in Great Bay to some extent. Using data from Great Bay (Pe'eri, Morrison, Short, Mathieson, Brook, & Trowbridge, 2008), NHDES determined that macroalgae mats had replaced nearly 5.7% of the area formerly occupied by eelgrass in Great Bay in 2007 (NHDES, 2009) and that replaced area has not been recolonized by eelgrass. Some of the loss of eelgrass in the intertidal zone is consistent with smothering by macroalgae. The foremost authority on macroalgae for this estuary, Dr. Arthur C. Mathieson, commented on the draft 2012 303(d) that he remains concerned about the macroalgae

and epiphyte conditions in Great Bay (NHDES, 2013). Burdick et al. (2016) note that, "Monitoring results from 2014 show high levels of cover of nuisance green and red algae (Ulva and Gracilaria, respectively) at all sites except near the mouth of the Estuary." The Burdick et al. (Burdick, Mathieson, Peter, & Sydney, 2016) study included several sites within Great Bay. Some of the classic indicators of nutrient eutrophication are present in this assessment zone and total nitrogen remains elevated in portions of the assessment zone. As the discussion above illustrates, there is a clear nutrient "signature" in the data."

- The 2016 303(d) has not yet been approved nor have all sections for Great Bay for the 2014 303(d) list.

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Coalition Assertion and Citation:

- The Coalition cites to NHDES's 2016 final Section 303(d) list and the Great Bay Estuary 303(d) List Technical Support Document (TSD) to support their view that nitrogen is not an issue for Upper Piscataqua River.
- The Coalition provides the following quote from the TSD, "However, there are insufficient response datasets to determine the eutrophication by total nitrogen alone is not known to be strong enough to warrant impairment under New Hampshire's narrative standard. Additionally, the nutrient load to this assessment zone is rapidly decreasing due to the ongoing work by the municipalities (Rochester reductions in 2015 and Dover began reductions in 2015). As such, this assessment zone has been assessed as Insufficient Information – Potentially Not Supporting (3-PNS) for total nitrogen."

Full/Omitted Citations EPA Perspective:

- Again, the Coalition leaves out important sentences prior to their citation. These sentences state, "The grab sample-based light attenuation (median=1.025 m^-1 (n=81)) is quite poor suggesting strong resuspension in the system. For shallow systems, it is expected that changes in macroalgae will precede changes in phytoplankton (McGlathery, Sundbäck, & Anderson, 2007) (Valiela, et al., 1997), as appears to be occurring in the Great Bay Estuary. The foremost authority on macroalgae for this estuary, Dr. Arthur C. Mathieson, commented on the draft 2012 303(d) that he remains concerned about the macroalgae and epiphyte conditions in Great Bay (NHDES, 2013). At this time there are some of the classic indicators of nutrient eutrophication present in this assessment zone and total nitrogen remains high".
- The 2016 303(d) has not yet been approved nor have all section for Great Bay for the 2014 303(d) list.

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Coalition Assertion and Citation:

- The Coalition believes that the Great Bay Estuary may have traits that make it tolerant of high nutrient levels.
- The Coalition cites the SOOE report stating,"[T]he Great bay estuary may have traits that make it more tolerant of high nutrient levels (such as high flushing rates) […] (SOOE at 8)."

Full/Omitted Citations EPA Perspective:

- The full sentence states, "While the Great Bay Estuary may have traits that make it more tolerant of high nutrient levels (such as high flushing rates) our system has three times the threshold from that study which is a concern."

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Coalition Assertion and Citation:

- The Coalition cites to external advisors for the SOOE report who reviewed stressors in Great Bay to support their assertion that the contribution of total nitrogen to conditions in Great Bay is not known.

Full/Omitted Citations EPA Perspective:

- The Coalition did not include the external advisors statement on page 9 of the report which states, "Despite encouraging reductions from wastewater treatment facilities, nitrogen loading levels are high enough that they should be considered an important stressor."

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